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Determining the Priorities of Macroprudential Indicators in Indonesia

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Financial system stability is the main prerequisite for the sustainability of a country's economic growth. In this context, macroprudential policy plays an important role in mitigating systemic risks originating from the financial and real sectors. However, the effectiveness of macroprudential policies is largely determined by the accuracy of the indicators used as early warning indicators. This study aims to determine the priority macroprudential indicators that are most relevant to Indonesia based on the assessment of experts. The method used is the Delphi method involving nine experts who have competence in the field of macroeconomics and financial stability. The analysis was carried out using statistical measures in the form of mean values, standard deviation, and interquartile range (IR) to measure the consensus level. The results showed that of the 20 macroprudential indicators analyzed, there were 13 indicators that reached consensus (convergent) and 7 indicators that did not reach consensus (divergent). The indicators with the highest priorities are the current account deficit, the adequacy of foreign exchange reserves, and the employment rate. These findings underscore the importance of external sector and labor market indicators in the macroprudential policy framework in Indonesia.

Keywords: Macroprudential Policy; Financial System Stability; Delphi Method; Indonesia

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INTRODUCTION

The global financial crisis of 2008 has prompted a paradigm shift in the management of financial system stability. Microprudential surveillance approaches that focus on the individual health of financial institutions have proven inadequate to prevent systemic crises from occurring. Therefore, macroprudential policies were developed as a complement to monetary and microprudential policies to identify, monitor, and mitigate systemic risks as a whole (Borio, 2003; Galati & Moessner, 2013).

Macroprudential policy emphasizes the importance of using macroeconomic and financial indicators that are able to reflect the accumulation of systemic risks, whether sourced from the external sector, the financial sector, or the real sector. In the context of developing countries such as Indonesia, the characteristics of an open economic structure, dependence on foreign capital flows, and labor market dynamics make the selection of macroprudential indicators a very crucial issue (Claessens, Ghosh, & Mihet, 2013).

Macroprudential policy is a set of regulatory and supervisory measures aimed at safeguarding the stability of the financial system as a whole by limiting systemic risk—the risk that financial distress spreads across institutions and markets and disrupts the real economy. More specifically, macroprudential policy focuses on: Preventing the build-up of systemic risk over time (cyclical risk), such as excessive credit growth, asset price bubbles, and leverage; and Enhancing the resilience of the financial system to shocks (structural risk), including risks arising from interconnectedness, concentration, and institutions that are "too big to fail."

Macroprudential indicators are quantitative measures used to monitor, assess, and signal systemic risk and financial stability conditions in the economy as a whole, rather than the soundness of individual financial institutions. In academic terms, Macroprudential indicators are statistical and financial variables that capture the build-up of vulnerabilities, interconnectedness, and resilience of the financial system, and serve as early warning signals for potential systemic crises.

Although various international institutions such as the IMF and the BIS have proposed a number of macroprudential indicators, there is not yet universal agreement on which indicators are most relevant for each country. This is due to differences in economic structure, the depth of financial markets, and the specific sources of vulnerability in each country (Drehmann et al., 2011). Therefore, an approach based on expert judgment is important in determining the priority of indicators that are in accordance with domestic conditions.

This study aims to fill this gap by determining the priority of macroprudential indicators in Indonesia using the Delphi method. This method was chosen because it is able to accommodate the collective assessment of experts in a systematic and structured manner, as well as generate consensus that can be used as a basis for policy formulation (Linstone & Turoff, 2002).

METHOD

This study aims to find priority macroprudential indicators in Indonesia. The data used are macro indicators in general. The total number of expert respondents was 9 experts. The application *Software* used as a tool is Microsoft Excel. The method used is the Delphi technique which is a qualitative method based on interviews with experts.

The Delphi method is a group process that involves interaction between researchers and a group of experts related to a specific topic, and through the help of questionnaires. This method is used to get a common point about future trends using a structured information collection process. This method is useful when the opinions and judgments of experts and practitioners are needed in solving problems.

This study will use the 3 most widely used statistical indicators in the application of the Delphi method, namely *mean* values, standard deviation values, and *interquartile range* or IR values. The first measure of convergence assessment is when the answers or assessments of all respondents have a standard deviation value of less than 1.5 (<1.5). The formula for standard deviation notation as already known is as follows.

$$s = \sqrt{\frac{\Sigma(x_i - \bar{x}).^2}{n-1}} \quad \text{or} \quad \sqrt{\frac{\Sigma x_i^2 - \frac{(\Sigma x_i)^2}{n}}{n-1}}$$

Where:

x = respondent A's answer to instrument n

$\bar{x}$ = average respondents' answers to instrument n

The next measure is the consensus assessment or convergence where the answers or assessments of all respondents have an *Interquartile Range* value or IR of

less than 2.5 (<2.5). The calculation of the IR value is the difference between the upper and lower quartiles (IR = Q3 – Q1), where the quartile value formula is as follows.

$$Q_1 = \frac{x_{(\frac{n-1}{4})} + x_{(\frac{n+3}{4})}}{2} \qquad Q_2 = x_{(\frac{2(n+1)}{4})} \qquad Q_3 = \frac{x_{(\frac{3n+1}{4})} + x_{(\frac{3n+5}{4})}}{2}$$

The measurement to express the convergence or consensus level of all variables is when the standard values of the deviation <1.5 and the *value of the interquartile range* <2.5. If one of the indicators does not meet the requirements, then the variable is declared non-convergent or not agreed (divergent). Meanwhile, for variables that have met the requirements, the next step is to rank with the highest average value for each variable that reaches consensus (convergent).

RESULT

Based on the literature study, there are at least 20 macroprudential indicators in Indonesia, namely: (1a) Current account deficit, (1b) Adequacy of foreign exchange reserves, (1c) Term of Trade (ToT), (1d) Composition & duration of capital flows, (1e) Export-import value, (2a) Economic growth, (2b) Inflation volatility, (2c) Interest rate volatility, (2d) Exchange rate volatility, (2e) Household CPI, (2f) Domestic interest rate, (2g) Fed interest rate, (3a) Trade spilover, (3b) Financial market correlation, (3c) Falling economic sectors, (4a) Foreign loans, (4b) Maturing debt, (4c) Ratio of external debt to GDP, (5a) Employment rate, (5b) Average annual wages and (5c) Labor market.

Of the 20 elements of macroprudential indicators in Indonesia above, the following is a complete answer in the form of weights given by the 9 expert respondents.

Table 1. Expert Respondent Answer Results

MACROPRUDENTIAL INDICATORS	R1	R2	R3	R4	R5	R6	R7	R8	R9
1a. Current account deficit	7	8	7	9	8	9	9	8	8
1b. Adequacy of foreign exchange reserves	8	8	5	9	7	9	9	8	8
1c. Term of Trade (ToT)	4	5	5	6	7	6	8	8	7
1d. Composition & duration of capital flows	6	6	7	8	7	8	8	8	7
1e. Export-import value	5	6	7	7	8	7	8	7	8
2a. Economic growth	8	9	3	8	6	8	9	8	8
2b. Inflationary volatility	5	7	3	8	7	8	8	8	7
2c. Interest rate volatility	7	8	5	7	6	7	9	9	7
2d. Exchange rate volatility	6	8	3	9	8	9	9	9	8
2e. Household CPI	4	7	5	6	6	6	8	7	7
2f. Domestic interest rates	3	7	5	7	6	7	7	9	8
2g. The Fed's interest rate	2	7	7	9	5	9	8	8	7
3a. Trade spindle	8	7	3	8	6	7	7	8	7
3b. Financial market correlation	7	8	5	9	6	8	8	8	8
3c. Falling economic sectors	6	6	5	7	7	6	9	8	7
4a. Overseas loans	6	9	4	7	6	7	8	9	8
4b. Debt due	5	9	5	9	7	9	7	8	7
4c. Ratio of Foreign Debt to GDP	4	7	5	8	8	8	9	8	8
5a. Employment rate	8	8	5	9	7	6	7	9	8
5b. Average annual wages	7	7	3	7	7	6	7	7	7
5c. Labor market	6	7	5	8	8	6	8	8	8

In the application of the Delphi method, there are 3 most widely used statistical indicators, namely *mean* values, standard deviation values, and *interquartile range* or IR values. Based on the results of the data

processing that has been carried out, the calculation of the priority of macroprudential indicators in Indonesia is as attached in the following table.

Table 2. Delphi Calculation Results Priority Macroprudential Indicators

MACROPRUDENTIAL INDICATORS	IR	STDEV	CONSENSUS		MEAN	RANK
			IR	STDEV		
Current account deficit	1	0,737	CONVERGE	CONVERGE	8,11	1
Adequacy of foreign exchange reserves	1	1,197	CONVERGE	CONVERGE	7,88	2
Term of Trade (ToT)	2	1,315	CONVERGE	CONVERGE	6,22	21
Composition of capital flows	1	0,786	CONVERGE	CONVERGE	7,22	10
Export-import value	1	0,943	CONVERGE	CONVERGE	7	13
Economic growth	0	1,771	CONVERGE	DIVERGE	7,44	6
Inflationary volatility	1	1,618	CONVERGE	DIVERGE	6,77	17
Interest rate volatility	1	1,227	CONVERGE	CONVERGE	7,22	9
Exchange rate volatility	1	1,886	CONVERGE	DIVERGE	7,66	3
Household CPI	1	1,133	CONVERGE	CONVERGE	6,22	20
Domestic interest rates	1	1,641	CONVERGE	DIVERGE	6,55	18
The Fed's interest rate	1	2,079	CONVERGE	DIVERGE	6,88	14
Trade spindle	1	1,474	CONVERGE	CONVERGE	6,77	16
Financial market correlation	1	1,165	CONVERGE	CONVERGE	7,44	5
Falling economic sectors	1	1,133	CONVERGE	CONVERGE	6,77	15
Overseas loans	2	1,523	CONVERGE	DIVERGE	7,11	12
Debt due	2	1,491	CONVERGE	CONVERGE	7,33	7
Ratio of Foreign Debt/GDP	1	1,548	CONVERGE	DIVERGE	7,22	8
Employment rate	1	1,257	CONVERGE	CONVERGE	7,44	4
Average annual wages	0	1,257	CONVERGE	CONVERGE	6,44	19
Labor market	2	1,1	CONVERGE	CONVERGE	7,11	11

Based on table 2, in general of the 20 macroprudential indicator variables, 13 variables have been agreed upon by experts and only 7 variables have not been agreed. Variables that are not agreed on related to macroprudential indicators in Indonesia are economic growth, inflation volatility, exchange rate volatility, domestic interest rate, Fed interest rate, foreign lending and external debt-to-GDP ratio.

Meanwhile, the order of the most important variables of Macroprudential Indicators in Indonesia are: (1) current account deficit, (2) adequacy of foreign exchange reserves, (3) Employment rate, (4) Financial market correlation, (5) Debt maturity, (6) Interest rate volatility, (7) Composition & duration of capital flows, (8) Labor market, (9) Value of exports - imports, (10) Distant economic sectors, (11) Trade spilover, (12) Average annual wages, and (13) Household CPI.

The results of data processing showed that out of a total of 20 macroprudential indicators analyzed, as many as 13 indicators reached consensus (convergent), while the other 7 indicators were declared not to reach consensus (divergent). Consensus criteria were determined based on standard deviation values of less than 1.5 and interquartile range (IR) values of less than 2.5, as commonly used in Delphi method-based studies (Hsu & Sandford, 2007).

Indicators that did not reach consensus included economic growth, inflation volatility, exchange rate volatility, domestic interest rates, the Fed's interest rate, foreign loans, and the ratio of foreign debt to GDP. This disagreement indicates a divergence in expert perceptions of the extent to which these indicators are able to represent systemic risks in Indonesia. This is in line with the findings of Borio (2014) who stated that traditional macro variables are often lagging indicators and are less sensitive in detecting systemic risk accumulation.

Based on the highest average value among the indicators that have reached consensus, this study identifies three main macroprudential indicators in Indonesia, namely the current account deficit, the

adequacy of foreign exchange reserves, and the employment rate.

The current account deficit ranks first, reflecting the high vulnerability of Indonesia's external sector to global shocks and sudden stop capital inflows reversal. These findings are consistent with the literature that emphasizes that external imbalances are one of the main sources of crises in developing countries (IMF, 2014).

The adequacy of foreign exchange reserves ranks second, indicating its role as a key buffer in maintaining exchange rate stability and the financial system as a whole. Adequate foreign exchange reserves allow monetary authorities to respond more effectively to external pressures (Obstfeld, Shambaugh, & Taylor, 2010).

Meanwhile, the employment rate ranks third, which confirms the close link between real sector stability and financial system stability. A weakening labor market can worsen credit quality, increase the risk of default, and ultimately threaten the stability of the financial system (Schularick & Taylor, 2012).

Macroprudential indicators are statistical and financial variables that capture the build-up of vulnerabilities, interconnectedness, and resilience of the financial system, and serve as early warning signals for potential systemic crises. Macroprudential indicators are used by central banks and regulators to: Detect early warning signs of financial instability; Guide the activation of macroprudential tools (e.g., LTV limits, capital buffers); and Evaluate the effectiveness of macroprudential policies.

CONCLUSION

Based on the results of the calculation, in general, out of 20 macroprudential indicator variables in Indonesia, 13 variables have been agreed upon by experts and only 7 variables have not been agreed. From the results of the calculation using the Delphi method, the 3 main priorities of the audit problem in zakat institutions in Indonesia are (1) current account deficit, (2) adequacy of foreign exchange reserves, (3) employment rate. The results of this study show that external sector and labor market indicators are seen as more crucial than conventional monetary indicators. This provides important implications for policy authorities in Indonesia so that the macroprudential policy framework does not only focus on the financial sector, but also considers the dynamics of the real and external sectors in an integrated manner.

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